OMP-26 - An Interactive Scheduling Tool for the DSN 26 Meter Subnet

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The Deep Space Network's (DSN) 26 meter (26M) subnet consists of antennas located at the Goldstone, Madrid, and Canberra Deep Space Communications Complexes, The antennas currently support a variety of earth orbiting spacecraft as well as the Space Shuttle. Scheduling the 26M subnet was a labor-intensive task that required a significant amount of manual review and editing of computer printouts, as well as demanding substantial negotiation time between projects to achieve a conflict-free schedule.

The Operations Mission Planner for the 26M subnet (OMP-26) was developed to assist schedulers in resolving conflicts more quickly. in 1992, a large number of spacecraft were launched that required support by the 26M subnet. This doubled the number of spacecraft being supported by the subnet, and as a result, the manual method of scheduling could not sufficiently meet the challenge of this increased mission set. The OMP-26 interactive scheduling tool was developed to automate the time consuming tasks of the existing manual scheduling process. This tool also serves as the baseline for which to built] a more powerful automated system that will be necessary to handle another major increase in mission support in the 1995 time frame.

OMP-26 capabilities have alleviated a significant amount of workload. The capabilities that have had the greatest impact to reducing workload are the graphical display of antenna load and conflict regions, and the ability to immediately identify the degree of conflict between tracks. In the previous system, the human scheduler's tools were a ruler, a pencil, and a computer-generated line listing of the schedule. In addition to being difficult to visualize the schedule, conflicts were identified by correlating a line number, located in the conflict column of the report, to a particular line in the listing. This method of conflict identification was time consuming and cognitively demanding. The graphical display of conflict regions and the tracks that create them, allows the human scheduler to identify alternate solutions to conflicts based on the graphical display of view periods and the existing antenna load. Also, the system has a number of features that allow the scheduler to traverse the schedule ancl make changes easily and quickly.

Although OMP-26 has reduced the scheduler's existing workload, another wave of mission support will occur by 1995. Therefore, the future plans for OMP-26 involve transitioning from a solely interactive scheduling tool to one that is highly automated. Other extensions to the tool, driven by project requirements, include extending the Graphical User Interface and providing a means by which the user will maintain all project profile data.

This paper will describe the 26M subnet scheduling problem, address the development of OMP-26, its capabilities anti how they are used, anct its benefits. The lessons learned, benchmark findings, and future directions will also be discussed.